MIL-STD-1760 DIGITAL LAUNCHER FOR NAVY/MARINE CORP 2.75-INCH ROCKET SYSTEM

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Abstract

Subject Terms

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Number of Pages
21

Marine Aviation Situation

- **Marine Corp Helicopter Upgrade Program**

AH-1W → **AH-1Z**

UH-1N → **UN-1Y**

  - 4 Bladed Rotor
  - Common Drive Train
  - New Cockpit Avionics
  - MIL-STD-1760 Weapons Communications

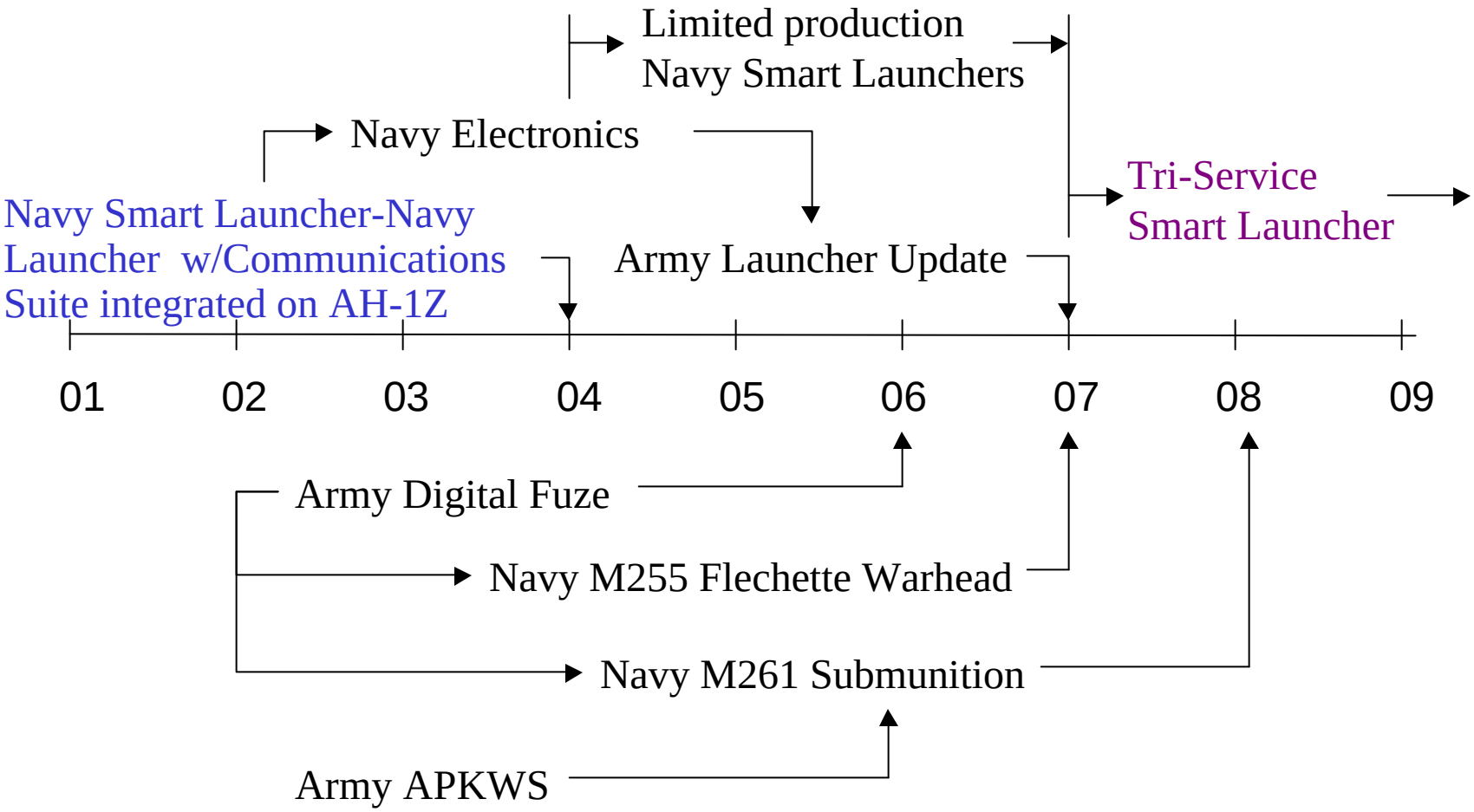
Current Navy/Marine Corp 2.75-Inch Rocket System

- **19 Tube - LAU-61C/A**
- **7 Tube - LAU-68 D/A**
  - Power is the only signal sent to launcher
  - Single or ripple fire
- **6 Basic Warhead Types**
  - Point Detonating Fuzed Warheads
  - Pre-Set Time Delay Fuzed Warheads
- **1 Motor Type**

Marine Corp Rocket Situation

- New High Capability Attack Helicopter
- Limited Capability Rocket System
- Navy/Marine Corp Launcher limits Weapon System Capability
  - Remote Set Fuze Warheads not useable
  - Future guided rockets require communications
- NAVAIRSYSCOM Defense Suppression Systems - PMA-242
  - Initiates program to improve Rocket Launcher

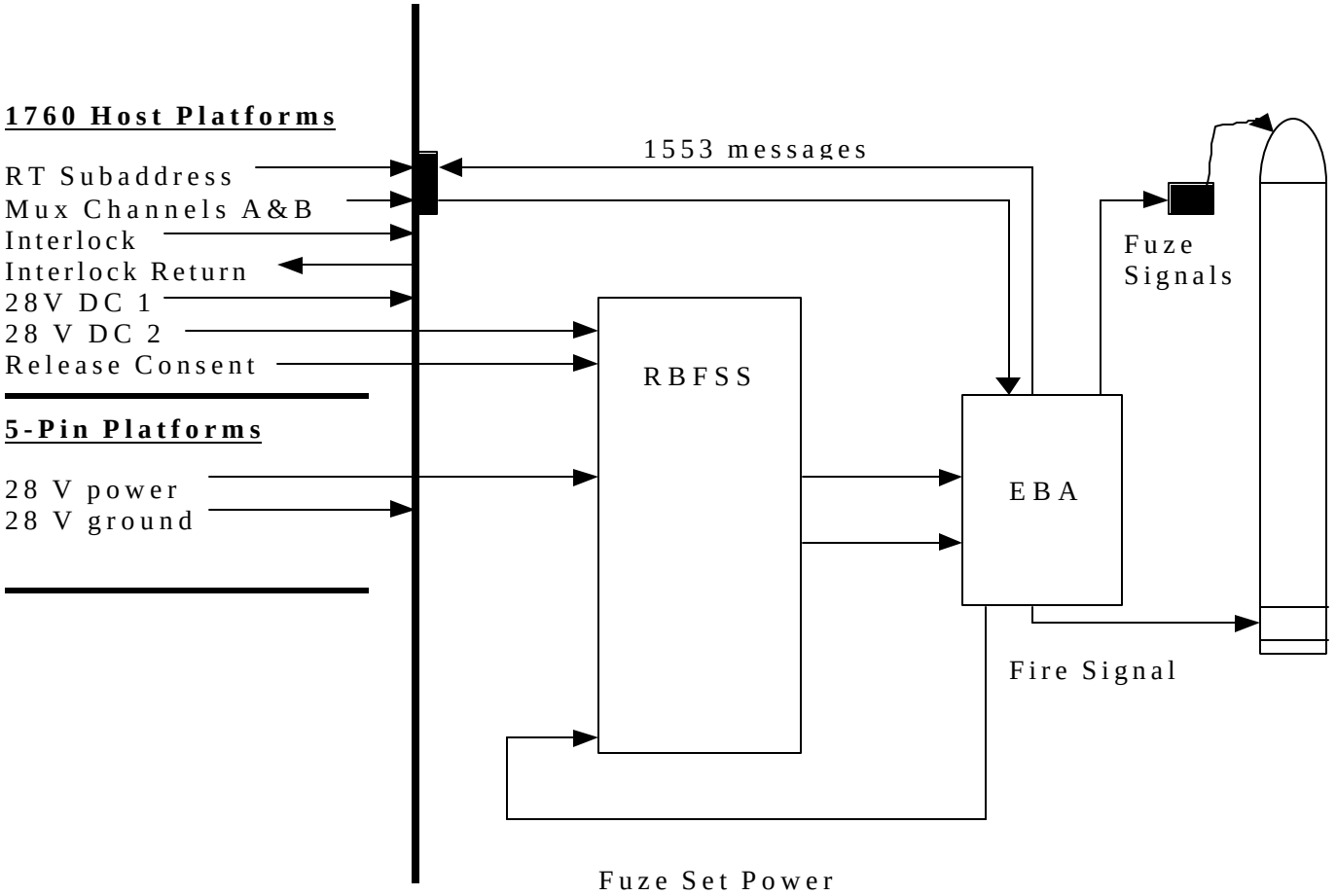
Navy/MC 2.75-Inch Rocket Digitization Roadmap



Smart Launcher Concept of Operation

- **MIL-STD-1760 Mode**
  - Digital Two-Way Communications
    - Platform sends commands
    - Launcher responds
      - BIT Status
      - Rocket Inventory
      - Fuze set signal
      - Rocket Motor fire signal
- **5-Pin Mode**
  - Launcher provides rocket motor fire signal

Smart Launcher Functional Diagram



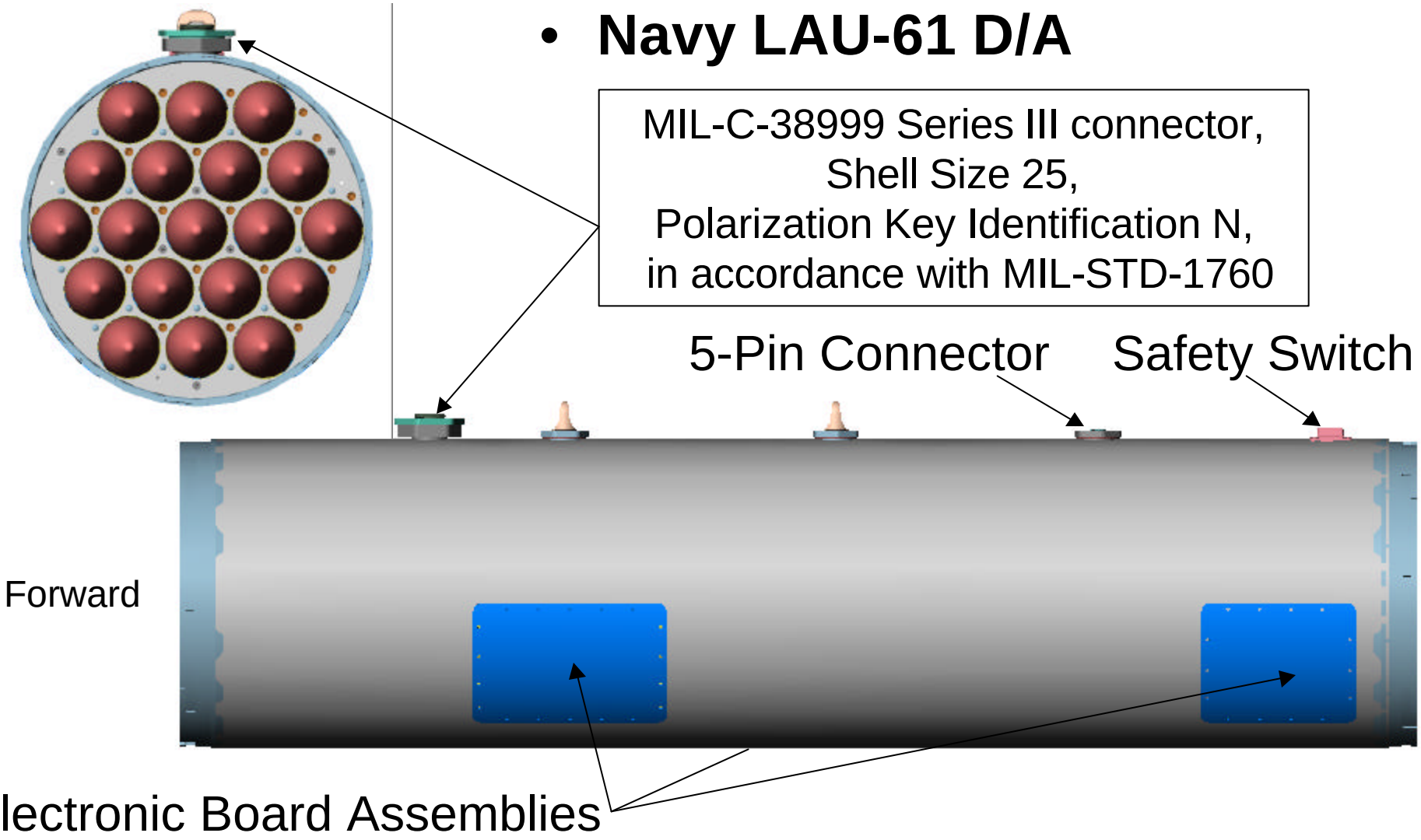
RBFSS – Remove Before Flight Safety Switch
EBA – Electronic Board Assembly

Smart Launcher Features

- **Digital Electronic Board Assemblies**
  - Conformally mounted in the LAU-61 Skin
- **MIL-STD-1760 Connection**
  - Forward of pylon interface
- **5-Pin Connector**
  - Aft of pylon interface
- **Warhead Fuzing Connection**
  - Army Style Forward Bulkhead Connectors
- **Remove Before Flight Safety Switch**

Smart Launcher Physical Layout

- **Navy LAU-61 D/A**



Smart Launcher 5-Pin Operating Modes

- **5-pin Mode**
  - Fires a single rocket for each trigger pull
  - Predetermined order to maintain jettison weight balance
  - No fuze setting capability

Smart Launcher 1760 Operating Features

- **Built In Test (BIT)**
  - Provides operational status of launcher
- **Inventory Function**
  - Provides a list of rocket types loaded in launcher
  - Must be input through maintenance equipment or platform
  - Host platform deducts fired rockets from initial inventory

Smart Launcher 1760 Operating Features

- **Continuity Check**
  - Measures resistance of rocket motor igniter circuit
  - Determines presence of fireable rockets
  - Conducted
    - as part of inventory request
    - after each firing

Smart Launcher 1760 Operating Features

- **Warhead Fuzing**
  - Supports M439 and M433 Analog Time Delay Fuzes
    - upgradable to Digital Setting Protocols
  - Aircraft Mission Computer calculates fuze set time
  - Launcher generates fuze setting signal
  - Each tube independently settable

Smart Launcher
1760 Firing Modes

- **Sequential Single Fire**
  - Each trigger pull
    - provides a Fuze Set Signal
    - fires one rocket
  - Predetermined order
    - maintains jettison balance

Smart Launcher 1760 Firing Modes

- **Selective Single Fire**
  - Gunner selects tube to fire
  - Each trigger pull
    - provides a Fuze Set Signal
    - fires one rocket
  - Provides gunner with recommended tube selection to maintain jettison balance

Smart Launcher 1760 Firing Modes

- **Selective Ripple Fire**
  - Gunner selects tubes to fire
  - Each trigger pull
    - provides Fuze Set Signals
    - fires all selected rockets
    - 60-100 millisecond delay between rockets
  - Provides gunner with recommended tube selections to maintain jettison balance

Smart Launcher
1760 Firing Modes

- **Ripple All Fire**
  - Each trigger pull
    - provides Fuze Set Signals
    - fires all rockets in launcher
    - 60-100 millisecond delay between rockets

Demonstration

- **Ground Launched rockets in April 2000**
- Modified LAU-61 D/A
- Controlled by Laptop running MIL-STD-1553 Aircraft Emulator
- Successfully demonstrated all Smart Launcher 1760 Modes

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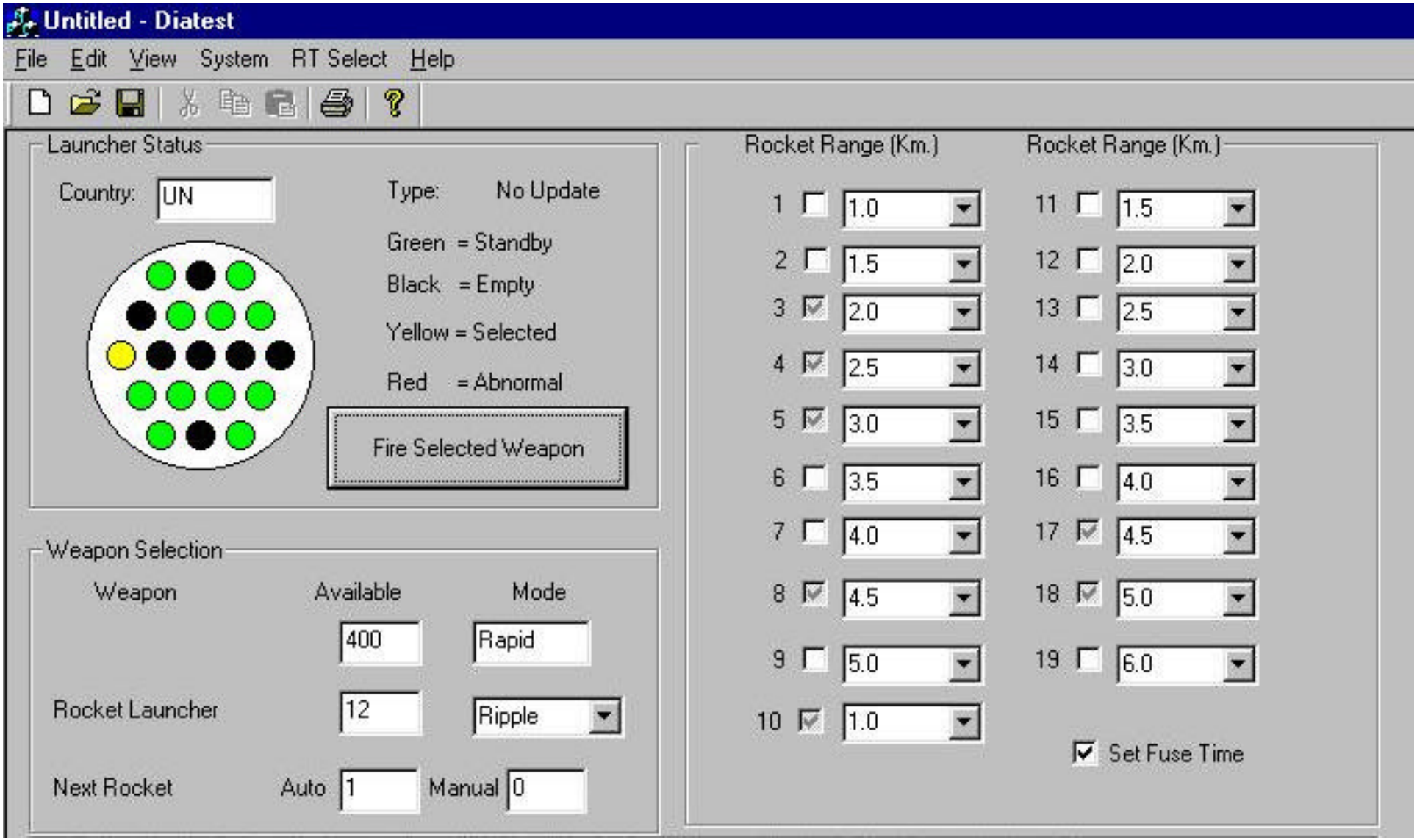
Control Screen



7 Shot Ripple Firing at Yuma

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Conclusions

- Digital control systems can be successfully integrated into legacy weapon systems.
- The addition of Digital Control to the Navy 2.75-Inch Rocket System will significantly upgrade it’s capability
- In-Flight Demonstration of the Navy Smart launcher is planned for 2003